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Strongyloides stercoralis and cytomegalovirus coinfection in a patient with a transplanted kidney

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ABSTRACT

Cytomegalovirus is a major opportunistic infection after transplantation with significant morbidity and mortality for solid organ transplant recipients. Unrecognized infection with *Strongyloides stercoralis* may result in significant morbidity and mortality in immunocompromised patients. Coinfection with multiple pathogens is possible, leading to diagnostic delays, and may make treatment more challenging. We report a case of coinfection with *S. stercoralis* and cytomegalovirus in a kidney transplant patient that resulted in pneumonitis, gastritis, and cholecystitis.

KEYWORDS Cholecystitis; gastritis; hyperinfection; immunosuppression; ivermectin; pneumonitis

Strongyloides stercoralis is an opportunistic nematode that can cause hyperinfection syndrome and death through autoinfection of the human host.[1,2] Cytomegalovirus (CMV) is a major opportunistic infection in transplant recipients resulting in significant morbidity, graft loss, and mortality.[3,4] Patients with *S. stercoralis* typically present with nonspecific gastrointestinal symptoms including abdominal pain, nausea, vomiting, bloating, diarrhea, and malabsorption.[5] Acute cholecystitis is possible due to obstruction caused by increased parasite burden.[6,7] We present a case of concomitant infection with *S. stercoralis* and CMV in a kidney transplant recipient who presented with pneumonitis and significant gastrointestinal symptoms and experienced resolution of the symptoms only after treatment for both pathogens.

CASE PRESENTATION

A 46-year-old woman who underwent deceased donor kidney transplant 2 months before presentation was seen for nausea, vomiting, and dyspnea for 2 weeks. Her CMV serostatus was +/+; she had received thymoglobulin induction, and her maintenance immunosuppression consisted of mycophenolate, tacrolimus, and prednisone. She was receiving trimethoprim-sulfamethoxazole and valganciclovir 450 mg daily for opportunistic infection chemoprophylaxis. Her baseline creatinine was 1.4 mg/dL. She had lived in Dallas, Texas, all her life. She worked in an office, denied any history of travel or sick contacts, lived alone, and had no pets.

On initial presentation, she was found to have bilateral pulmonary infiltrates and left lower lobe consolidation on computed tomography, and procalcitonin was mildly elevated at 0.29 ng/mL. Thus, she was started on empiric ceftriaxone and doxycycline. A 1–3 beta glucan was <31 pg/mL, and a CMV polymerase chain reaction test returned elevated at 16,478 IU/mL. Treatment with intravenous ganciclovir was begun, and she was given three doses of intravenous immunoglobulin with clinical improvement and hospital discharge.

Four days after discharge, she was readmitted with persistent nausea, vomiting, and diffuse abdominal pain. Physical exam revealed epigastric tenderness. Laboratory values included a normal white blood cell count, normal liver function tests, and normal bilirubin. Abdominal ultrasound suggested chronic cholecystitis, while cholescintigraphy was indicative of acute cholecystitis. Therefore, she was started on intravenous eravacycline, and intravenous ganciclovir was continued.

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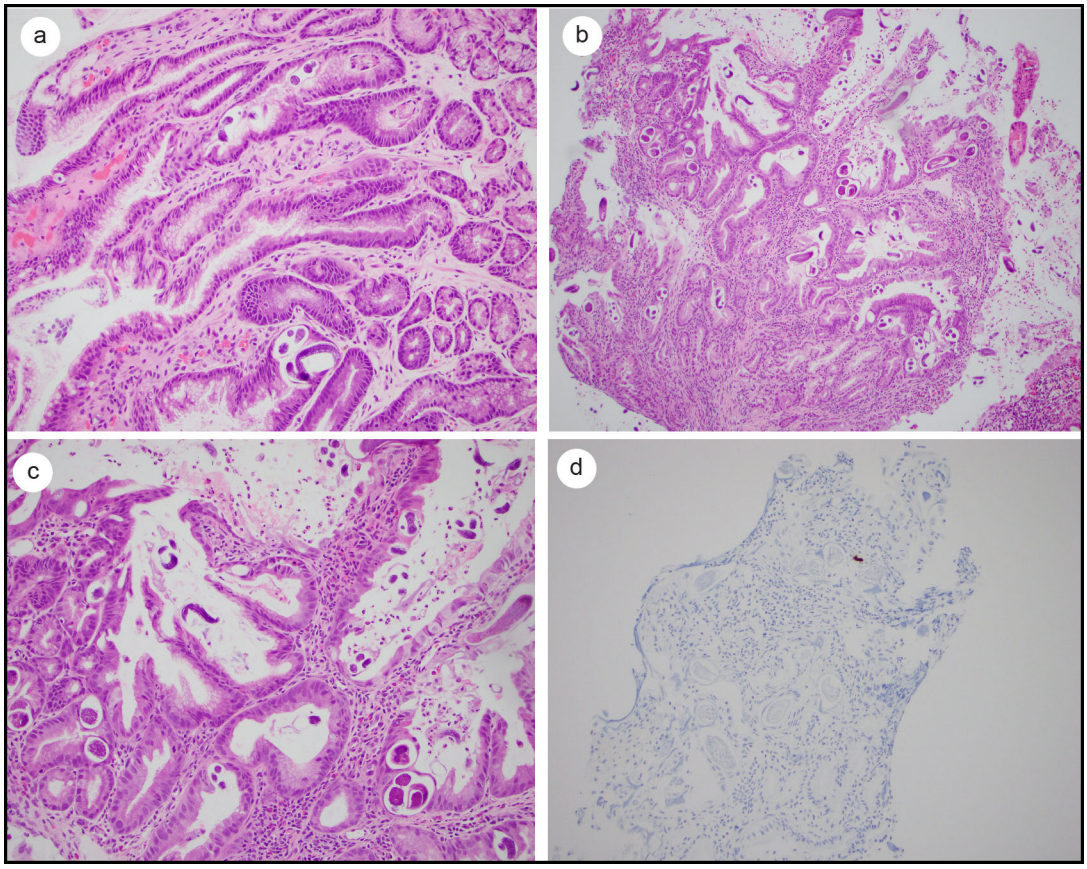

Figure 1. Hematoxylin and eosin stain of the gastric (**a**, 200×) and duodenal (**b**, 100×; **c**, 200×) biopsy showing multiple *Strongyloides* nematodes within the mucosal crypts and lamina propria. **(d)** Immunohistochemical stain of the duodenal biopsy demonstrating the cytomegalovirus inclusion (200×).

Esophagogastroduodenoscopy showed gastritis and duodenitis. Histopathologic examination of both duodenum and stomach revealed *S. stercoralis* in mucosal crypts and lamina propria, while one CMV viral inclusion was found in the immunohistochemical stain of the duodenal biopsy *(Figure 1)*. Treatment with ivermectin was started along with concomitant reduction in immunosuppression, resulting in symptomatic improvement. *Strongyloides* serology eventually returned negative. The patient was discharged from the hospital to complete a 14-day course of ivermectin. She continues to do well during follow-up outpatient visits.

DISCUSSION

S. stercoralis is a roundworm endemic to the southeastern United States.[2,8] Clinical syndromes range from acute infection and chronic infection to autoinfection and hyperinfection syndrome with dissemination.[6] Immunosuppression with corticosteroids, steroid-sparing agents, and human T lymphotrophic virus type 1 are common triggers for hyperinfection syndrome.[9] The diagnosis via conventional stool examination is often challenging because of low parasite load and irregular larval output.[5] Serological testing is the preferred and most sensitive diagnostic method but may be falsely negative in immunocompromised hosts, similar to our patient who had recently received induction therapy with thymoglobulin.[10,11] Endoscopy for evaluation of gastrointestinal symptoms can help with the diagnosis through the histopathology specimens.[12] Ivermectin is considered the drug of choice to treat strongyloidiasis, with albendazole being a second-line alternative.[6,13]

Concomitant infection with *S. stercoralis* and CMV is rare and has been reported in a few patients who were all immunosuppressed; it has also been found occasionally on postmortem examination.[9,14–18] *Strongyloides* infection in solid organ transplant recipients can be due to reactivation of a previous infection or can be newly acquired, either through contaminated food or water or donor derived.[6,17] CMV may down-regulate the TH-2–dependent immune response against *S. stercoralis,* leading to severe infection.[9,17] As both *Strongyloides* and CMV can present with nonspecific gastrointestinal symptoms, a high index of suspicion is required for early diagnosis and treatment in immunocompromised patients with unclear etiology. Thus, it is important to remember that immunosuppressed patients may present with more than one opportunistic infection at a given time.[19]

We considered the possibility of this being a donor-derived infection. Other transplant recipients from the same donor were also screened and were negative. An investigation of the donor in the United Network for Organ Sharing did not reveal any suspicion; moreover, serology testing was

performed on the donor plasma and was negative for *Strongyloides*. It is possible that the diagnosis of cholecystitis in our patient was related to high parasite burden causing biliary obstruction, with improvement following therapy with ivermectin. *S. stercoralis* screening should be considered for patients who will undergo immunosuppression in endemic areas.[20] Screening with serology is not routinely performed in our center.

In summary, we present a case of coinfection with *S. stercoralis* and CMV in a kidney transplant recipient and highlight the need for a broad diagnostic investigation in immunosuppressed patients with unexplained symptoms.

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